varied alike. In other cases, however, for many consecutive days no agreement between the two series is apparent. It is greatly to be desired that this matter should receive a thorough investigation, but the method by which the problem may be successfully attacked is not obvious.

## THE MEASUREMENT OF THOUGHT AS FUNCTION.

BY DANIEL G. BRINTON, M.D.

(*Read October 11, 1897.*)

I can best introduce what I have to say by a quotation from the address of Vice-President McGee before the late meeting of the American Association at Detroit. He refers in it to a distinguished member of our own Society who, I am glad to see, is with us to-night; and the words I am about to quote are of such a tenor that that they cannot be otherwise than agreeable. Mr. McGee said:

"Less than a quarter of a century ago Barker was deemed bold unto recklessness for undertaking to correlate vital and physical forces, and many heads were shaken doubtfully when, in his presidential address before the American Association at Boston in 1880, the same brilliant experimentalist argued from the application of Mosso's plethysmograph that mental force also may be weighed and measured, so that it must be regarded as interconvertible with other forms of energy; yet less than half a generation of organic chemistry has established these revolutionary propositions beyond peradventure" (*The Science of Humanity*, by W. J. McGee, Vice-Pres., Address before Section H, at Detroit, 1897).

These words must have been intended by their writer to have important limitations. If taken in their ordinary sense they would convey a very erroneous idea of the achievements of physical and chemical science.

It is quite true that the action of thinking is in one sense a function of the brain, and is accompanied by cell destruction, by increased temperature and by the increased elimination of inorganic matter through the secretory organs. For this reason it was said by one of the older physiologists that "without phosphorus there is no thought." In a somewhat similar manner others have undertaken to demonstrate that thought is merely a mechanical process,

and, indeed, a logical machine was invented by Jevons which could carry out a proposition from major premise to conclusion. From another aspect the late Dr. Post, of Bremen, used to maintain that "we do not think, but thinking goes on within us;" just like any other involuntary function of our bodies.

All such statements must be understood to apply only to certain concomitant phenomena of thought; but by no proper use of words can such phenomena be taken as the measure of thought itself. This measure eludes all chemical and physical research, and can in no way be calculated by mechanical formulas. The worth of the thought bears no relation whatever to the physical changes of temperature and cell activity concerned in its production. Mental force cannot be weighed and measured, nor is it convertible by any means known to us into other forms of energy.

The value of thought and the measure of mental force is, as has already been intimated by our distinguished guest this evening, the *truth* of the thought, the verity of the proposition. To quote from Shakespeare, "A tale told by an idiot, full of sound and fury, signifying nothing," may cost that poor idiot's brain just as much cell-destruction and increased temperature as did the composition of *Macbeth* to the great dramatist. A false or a worthless thought involves just as many changes as a true and valuable one. The brain of the savage is often as active, functionally, as that of the devotee to science; but how different the value of the results! As a physical stimulus affecting the lives of organic beings, the truth of thought is the only measure of the power of thought.

A striking confirmation of the views I am urging is the undoubted fact that the greatest conquests of thought, its most valuable productions, arise when the functional activity of the brain is at a low ebb. They are the fruits of what is called "unconscious cerebration;" or by its more modern name, "subliminal consciousness." The greatest inventions, the solutions of the most difficult problems in mathematics, the most marvelous inspirations of genius in art, have reached their finders in such passive moments. How wide of the mark, therefore, is it to expect to measure mind by units of matter! There is absolutely no common measure between them, and nothing in modern chemical or physical science weakens this ancient doctrine.

If what I have said is true as respects the facts of science, how much less capable are material weights and measures of appraising

those spiritual forces, whose potency lies in exalting the character of the individual, and in elevating the tone of national life, and on which alone we must depend for the real progress of the human race?

Let me, in conclusion, present this last point in the words of one of the noblest and most gifted women of our English-speaking race—Elizabeth Barrett Browning:

> "If we tread the deeps of ocean, if we strike the stars in rising,
> If we wrap the globe intensely in one hot electric breath—
> 'Tis but power within our tether—no new spirit-power comprising,
> And we are not greater men in life, nor bolder men in death."

*Stated Meeting, October 15, 1897.*

President FRALEY in the Chair.

Present, 41 members.

Mr. Stewart Culin, a newly elected member, was presented to the Chair, and took his seat in the Society.

Donations to the Library were reported, and thanks were ordered for them.

The death was announced of Prof. Alfred L. O. Cloiseaux, of Paris, France, a member of the Society.

Mr. Rosengarten was appointed to prepare the obituary notice of Mr. J. Sergeant Price.

Nominations Nos. 1380, 1389 to 1398, 1400, 1402 to 1409, 1418, 1423 to 1431 were read and spoken to, and Tellers were appointed to conduct the election for members, who reported the following as having been elected members:

2323. Clarence B. Moore, Philadelphia.

2324. James Biddle Leonard, Philadelphia.

2325. George Vaux, Jr., Philadelphia.

2326. James Seguin DeBenneville, Philadelphia.

2327. Richard H. Sanders, Philadelphia.

2328. William Tatham, Philadelphia.

2329. Gregory B. Keen, Philadelphia, Librarian of the University of Pennsylvania.